

Tip Speed Blending

Tip Speed - Establishing Optimal Blending Speed

Tip speed (angular velocity) is a constant that can be used to establish an initial blending speed for a given bin geometry. The blender speed may need to be adjusted upon further testing but is a good starting point. The tip radius is the distance perpendicular to the blender rotational center measured to the furthest top bin corner.



Formula

TS = 2100 in/min tip speed constant

TR = Tip Radius (in inches)

RPM = blender rotational speed (in revolutions per minute)

PI = 3.1415

$RPM = TS / (PI \times TR \times 2)$

These speed values are approximate based on average density materials 40#/ft³, good flow properties, and particle sizes within 40% of each other. This formula is not relevant for IBC capacities less than 200 liters.

Adjusting for less than ideal product

Product density influence on blend speed

Increase blend speed for denser products

Decrease blend speed for lighter products that are prone to aeration.

Product flow properties influence on blend speed

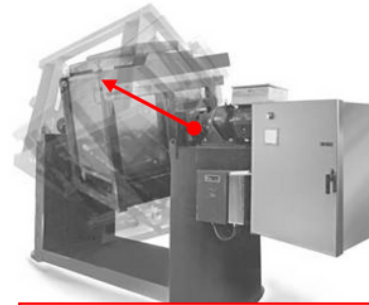
Decrease blend speed for products with poor flow properties

Increase blend speed for products with excellent flow properties

Tip Speed Blending- Cont.

Particle size influence on blend speed

Particle size variation over 40% - blend speed change has little effect. Draw blend samples much more frequently (at least every minute of blend time) during initial blend testing because batches with large particle size variation can de-blend if run too long.



Tip Radius - Measure perpendicular from blend center to outermost corner of the IBC